

# DISTRIBUTED FEEDBACK LASER FOR ISOLATOR-FREE OPERATION

## ABSTRACT OF THE DISCLOSURE

- 5     An integrated semiconductor device comprising a laser on a substrate, the laser having an active layer and a current-induced grating, such as a current-injection complex-coupled grating, within a laser cavity producing a single-mode output light signal at high data rates ( $> 622$  Mb/sec) in isolator-free operation. The grating has a coupling strength product  $\kappa L$  greater than 3, where  $\kappa$  is the coupling coefficient and  $L$  is the
- 10    length of the laser cavity. In certain embodiments, the laser is a distributed feedback (DFB) laser that emits light at a wavelength of about  $1.5 \mu\text{m}$ . The strong current-induced grating prevents mode hopping between multiple degenerate Bragg modes. The laser is also characterized by excellent immunity from optical feedback, and can be operated without an isolator at high data rates.

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